British Columbia Institute of Technology
Burnaby Campus

Solid Waste Audit

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1. Executive Summary

BCIT's Environmental Policy states that the institution will "manage operations to promote environmental protection in ways which meet the needs of the present without compromising the ability of future generations to meet their own needs". Determining how best to achieve this goal requires an understanding of BCIT's current impacts. Understanding current practices in terms of material consumption, solid waste generation, social impacts, energy use and waste use can act as a baseline against which BCIT can measure its progress towards sustainability.

BCIT has well-established solid waste reduction and recycling programs. However, the programs have not been formally evaluated since 1994. In order to further its progress towards waste minimization and to measure this progress, BCIT retained the services of Mary Jean O'Donnell in the spring of 2002.

Mary Jean O'Donnell has over 12 years of experience in the solid waste and recycling industry. With the University of BC, Mary Jean designed and implemented innovative waste reduction and recycling systems for a campus community of 35,000. More recently, Mary Jean has worked successfully with school districts, municipalities, First Nation communities, small and large businesses to develop cost effective and efficient waste reduction and recycling programs.

Three tasks were completed to further BCIT toward its goal of sustainability:

- Performance of a solid waste and recycling systems review;
- Development of a new baseline of waste generation at the Burnaby campus;
- Development of a waste audit methodology that could be used by BCIT in the future.

This report acts as a follow-up to the 1994 waste assessment and creates a new picture of BCIT's impact through the Burnaby Campus solid waste generation study. This report contains the results of the study as well as the methodology employed in conducting the solid waste audit. The waste audit methodology is included for the primary reason that it is transferable and repeatable – allowing BCIT to conduct waste audits at its satellite campuses and in the future.

The study had several components:

i) A review of 2001/02 solid waste and recycling data;
ii) A solid waste audit of the Burnaby campus;
iii) A review of the waste and recycling systems on the Burnaby campus and;
iv) A review of the existing waste collection contract.

(The BCIT Environmental Education Coordinator was involved in components (i) to (iii) of the study as a means of developing in-house capacity to conduct audits at other BCIT locations and in the future.)

The solid waste audit was conducted in three stages: pre-audit preparation, an on-site audit and post-audit follow-up. The data compiled during the audit included quantity and composition information. It was found that the largest component remaining in the solid waste stream is compostable materials such as “food/yard waste” (29%) and the second largest component is “mixed paper” (22%) which can be recycled in BCIT’s paper program. “Composite plastic” represents 13% of the waste stream by weight. While this is a significant volume, these materials are difficult to recycle and are best eliminated from the waste stream.

The operations review looked at how waste materials are managed on the Burnaby campus. The review looked at waste inside the buildings and how this waste moves from its generation points to the loading areas. The review focused on the paper and cardboard recycling systems. Additionally, key operational staff were interviewed to obtain further insight into how the existing solid waste and recycling systems operate.

The garbage and recycling collection contracts for the Burnaby campus were reviewed to assess service levels and to identify areas for potential cost savings. At the Burnaby campus current service levels of the front load bins appears to be adequate. Savings could potentially be achieved through the implementation of compaction equipment that would reduce collection and hauling costs of both cardboard and garbage.

Recommendations to improve the existing waste management system at the Burnaby campus are included in each section of the report. They are based on the results of each component of the solid waste study. As a means to further BCIT along the path of waste reduction, the report concludes with the following recommendations for consideration in the next fiscal year:

1. Perform an inventory of recycling equipment.
2. Replace the current rack and bag collection system for mixed paper with the toter system.
3. Implement a “zero waste” program in office areas by replacing cardboard deskside recycling containers with permanent bins and mini-garbage containers.
4. Consider the purchase or lease of compaction equipment for cardboard and garbage at the two main cafeteria buildings.
5. Continue to monitor waste reduction performance and report the results throughout the BCIT network.
6. Perform solid waste and recycling audits of satellite campuses.
7. Develop new and consistent signage for:
   - ?? Individual recycling and garbage containers.
   - ?? Student and public recycling areas.
   - ?? Loading bay areas.
8. Develop new communications about recycling and waste reduction for faculty, staff and students. These should consist of new pamphlets and posters.
9. Develop a recycling/waste reduction education element for the training of new faculty and staff.

10. Work with buyers to improve packaging and delivery specifications with the goal of reducing the amount of incoming packaging waste to zero.

The review of historical solid waste data showed that BCIT is performing at a steady state level in terms of the quantity that is recycled versus the quantity disposed. Data for April 2001 to March 2002 indicates that BCIT is diverting 43% of its solid waste to recycling. This number is very similar to the 1992/93 waste diversion rate of 40%. While there are many measures of success on the BCIT campus it is important to be aware of the incremental level of improvement to the recycling rate to ensure that future endeavors will aim towards further waste diversion.

2. Solid Waste Composition Study

2.1 Introduction

This report follows up on the solid waste assessment work conducted in 1994. It creates a new baseline of solid waste and recycling generation at the BCIT Burnaby campus. This information identifies BCIT's impact in terms of solid waste generation by reporting on the findings of the waste study of the Burnaby campus. The report also contains the methodology employed in conducting the solid waste audit. This methodology is transferable and repeatable and provides the tools to allow BCIT to conduct future solid waste audits at this facility and at its other campuses. Ultimately, this report itself is fundamental to capacity building within BCIT.

2.1.1 Capacity Building

To develop a solid waste generation baseline and ensure waste elimination progress can be measured, BCIT will need to conduct additional audits of their waste stream at its other campuses and in the future. It was determined through discussions with BCIT staff that the most effective means to conduct these audits would be to develop auditing skills within existing staff. Consequently, as part of the audit exercise, BCIT's Environmental Education Coordinator was trained in the audit methodology. The Environmental Education Coordinator is now capable of conducting future solid waste audits thereby allowing BCIT to work independently on its waste reduction goals. Capacity building was achieved through the work that took place in advance of the audit, hands-on training during the audit process and follow-up subsequent to the audit.

2.2 Solid Waste and Recycling Data Review

The first step in creating effective solid waste reduction and recycling programs is by establishing generation rates and identifying annual waste reduction goals. The information provided by the solid waste and recycling data review and the waste audits will provide critical information for decision making and resource allocation. Ensuring the use of current data will supply the information necessary to further reduce BCIT's waste generation – to maximize re-use and recycling capacity and to decrease overall operational costs.

Solid waste and recycling data for April 2001 to March 2002 was reviewed and analyzed as part of the study. The purpose of looking at background information was to establish recycling and solid waste generation rates and a baseline for measurement of future progress.

Records were obtained from the garbage hauler and the paper recycler. Unfortunately, the solid waste hauler does not weigh the quantities collected from the front-load garbage containers and was only able to provide estimated data. Consequently, solid waste data was estimated using industry standards, quantitative information on seasonal variations was not available. To balance the

standardized measurement, actual activity on the campus was taken into account: staff observation and student attendance patterns provide a rationale for assuming the volume of waste decreases during the summer months.

2.2.1 Key Findings from the Data Review

Historical solid waste data illustrates that waste to landfill decreased in 2001/02 compared with previous years. In 2001/02, approximately 871 metric tonnes of garbage was sent to landfill, while in 1992/93, approximately 1000 metric tonnes of garbage was sent to landfill. This 13 per cent decrease in waste disposal demonstrates on-going improvement in waste diversion. In 2001/02 recycling levels also improved. Total materials recycled and composted in 2001/02 weighed 665 metric tonnes. Chart 1 compares materials diverted to recycling with materials sent to landfill in 2001/02. Appendix A contains detailed 2001/02 solid waste and recycling data.

Chart 1. Burnaby Campus Solid Waste Stream 2001/2002

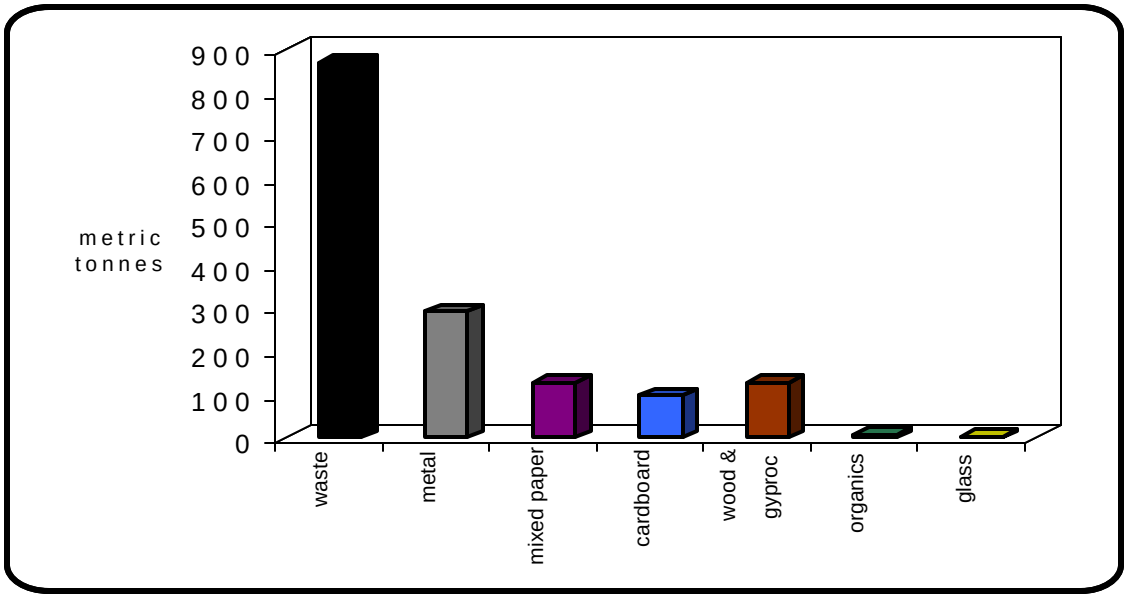


Table 1 illustrates the total annual cost of solid waste disposal and recycling. In 2001/02, BCIT spent approximately $97,128 for solid waste disposal, as compared with approximately $58,487 for recycling. Table 1 also compares the cost per metric tonne for recycling and disposal ($111.50 per metric tonne for waste and $87.92 per metric tonne for recycling). The total diversion savings are calculated by subtracting the cost per metric tonne for recycling from the cost per metric tonne for disposal. This figure is then multiplied by the total amount of waste diverted to recycling; this results in annual cost savings of approximately $15,681.

Table 1. Solid Waste and Recycling Summary 2001-2002

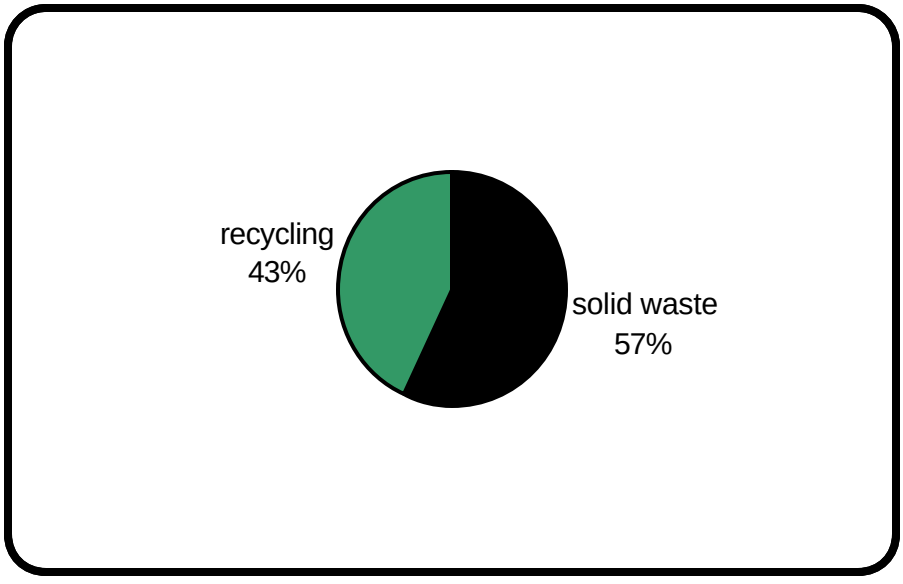
SOLID WASTE			RECYCLING			DIVERSION RATE/ COST SAVINGS		
Metric Tonnes	Annual Cost	Cost/MT	Metric Tonnes	Annual Cost	Cost/MT	Diversion Rate	Cost Savings/ MT	Total Diversion Savings
871	**$97,128**	**$111.50**	**665**	**$58,487**	**$87.92**	**43%**	**$23.58**	**$15,681**

Table 2 provides information on the 2001/02 waste diversion rate. To calculate the waste diversion rate, the waste generation rate is calculated first. To calculate the *waste generation rate*, the annual totals for landfill, composting, and recycling are added together. Then, the weight for recycling and composting is divided by the waste generation rate; this number is the waste diversion rate as defined by the BC Ministry of Land, Air and Water. Based on these figures, waste diverted from landfill is 43 per cent. Chart 2 illustrates the BCIT waste diversion rate.

Table 2. Waste Diversion Rate 2001/02

	2001/02
Disposed (metric tonnes)	871
Recycled/Composted (metric tonnes)	665
Total Waste Generated	1536
% Recycled/Composted	**43%**

Chart 2. Waste Diversion Graph 2001/02



2.3 Burnaby Campus Solid Waste Audit

The audit was conducted in three stages:

i) Pre-audit preparation
ii) On-site audit
iii) Post-audit follow-up

The pre-audit preparation focused on team and project building. It involved identifying audit-team participants and working with the waste hauler to determine the optimal day for the audit. This process also included arranging equipment and supplies, and the development of audit forms and waste definitions. The members of the waste audit team were Todd Johnston Environmental Education Coordinator), Shreya Nand (student) and Mary Jean O'Donnell (consultant).

Prior to initiating the waste sort, Mary Jean O'Donnell and Todd Johnston met with key staff to outline the goals of the project. The team answered questions and responded to concerns before carrying out the waste sort. To ensure safety for audit team members, protective gear was distributed and safety procedures were outlined.

For this study, 43 kg of waste was sampled from the NE1 building and 60 kg of waste was sampled from SW1 building for a total sample of approximately 103 kg. It was identified that these two buildings were representative of most activities on the campus. The material audited represented approximately one-third of the volume of waste found in each of the six and eight cubic yard garbage containers respectively. To create a stratified sample, every third bag of garbage was removed from the containers. The bags were opened and sorted into twenty different waste categories. The sorting and classification process took approximately six hours to complete. For detailed information on the solid waste audit methodology and the tools used please refer to Appendix B.

On March 20th 2002, the on-site solid waste audit was carried out at the BCIT Burnaby campus. The purpose of the audit was to establish the institution's baseline waste disposal level. The Burnaby campus was also used as a pilot to test and refine auditing procedures for use at other campuses and in the future.

The audit took place on a single day and represents a one time "snap-shot" of the solid waste stream at the Burnaby campus. Such one time sampling can create an accurate picture of the waste stream if the seasonal variation of the waste is not significant. In BCIT's case, although seasonal variations do exist, the types of waste generated do not vary significantly. Consequently, the waste composition snapshot taken of the waste stream on March 20th is considered to be representative of the institution's waste throughout the year.

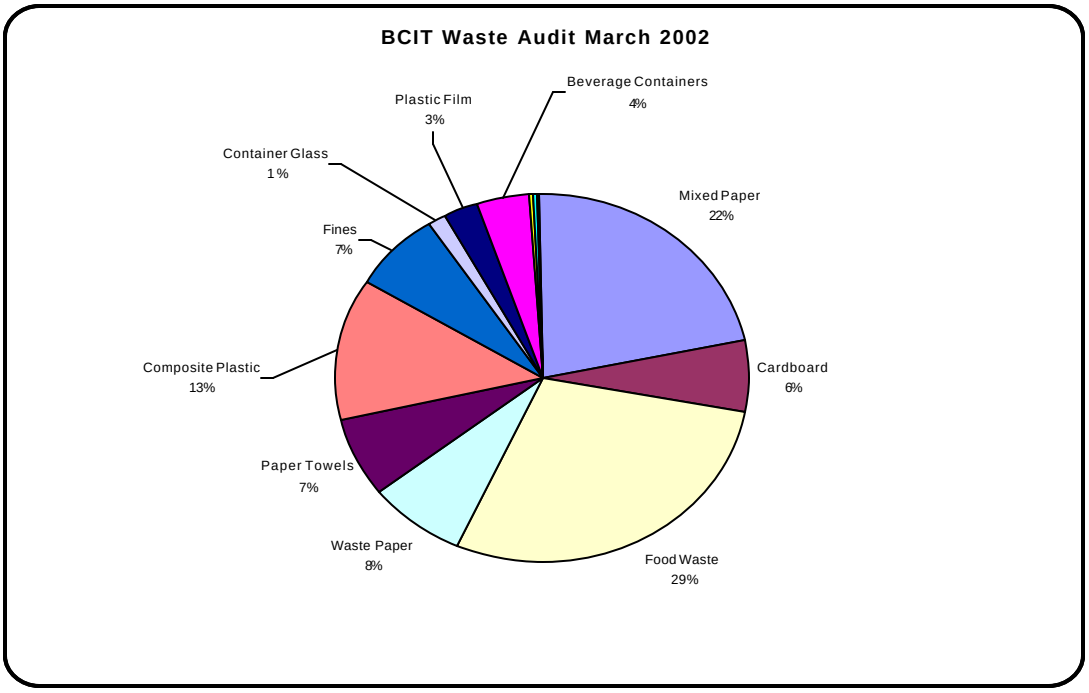
2.3.1 Key Findings from the Burnaby Campus Waste Audit

It was found that the largest component remaining in the solid waste stream is compostable materials – making up 44 per cent. Chart 3 represents the solid waste stream as it was sampled and categorized during the audit. The chart breaks down the composition of the waste generated at the Burnaby campus. The categories "food/yard waste" (29%), "waste paper" (8%) and "paper towels" (7%) represent the three potentially compostable components. The "food/yard waste" category consisted primarily of leftover cafeteria waste. The "waste paper" category consisted of paper plates and cups while the "paper towel" category contained paper towels and tissue paper, these types of paper are not recyclable due to the potential for bacterial contamination and the shortness of the fibres, however they can be successfully composted. Together these categories characterize almost half of the total waste stream.

- "Mixed Paper" represented 22% of the solid waste stream and was the next largest category. The mixed paper category contained mostly office paper and newspaper. These materials are considered recyclable in BCIT's paper recycling program.

- "Composite Plastic" represented 13% of the waste stream. The composite plastic category consisted of candy wrappers, chip bags and other mixed plastic containers. Although it is a significant portion of the waste stream, there are very few options for recycling these materials. The only real solution is elimination.

Chart 3. Burnaby Campus Solid Waste Stream by Component



2.4 Operations Review

In conjunction with the composition of the solid waste stream, the waste collection system is a fundamental part of an efficient and cost-effective system. The operations review looked at how waste materials are managed throughout the campus – how waste moves from its generation points to the loading areas. The review of the points of waste generation was conducted to discern additional information about how and why various wastes are generated.

The waste audit team conducted an operations review of the campus. The team did 'walkabouts' as well as a tour with the recycling truck driver. On foot they examined various buildings, visually identifying solid waste disposal and recycling practices throughout. This audit entailed examining recycling and garbage containers (their condition, contents and signage) in the administrative areas, classrooms, cafeterias and the library as well as exterior loading areas.

Materials Collected at BCIT

At present BCIT collects Paper, Cans, Glass, Beverage Containers, Organics, Wood Waste, Gyproc, Scrap Metal, Tires, Batteries, Used Oil, Toner Cartridges, Antifreeze and Cardboard. The scope of this audit was limited to those materials considered to be "solid waste" and thus, did not look at used oil, toner, antifreeze or other potentially hazardous materials.

Paper and cardboard represent a large percentage of the solid waste generated at academic institutions. In 2001/02, BCIT recycled approximately 225 metric tonnes of mixed paper and cardboard. This diversion from landfill saved the institution approximately $5,305 last fiscal year. Given that mixed paper and cardboard represent such a significant portion of the waste stream, conducting periodic reviews of these systems will ensure optimal functionality from an efficiency and economic perspective.

Overall recommendations stemming from the operations review are provided in section 2.4.1.

2.4.1 Recommendations from the Operations Review

The following recommendations stem from observations made during the operations review. Although the recycling levels at the Burnaby campus are acceptable, the program could be improved to address issues such as equipment, increased communication with staff, faculty and students, program aesthetics and economics.

- Consider replacing the bag and rack system for paper collection with toters. A toter-based system will improve paper recycling economics and program participation.

- Initiate record keeping of the quantities of paper collected. Detailed records will assist with future measurement of the paper recycling system.

- Perform a recycling equipment inventory. At present no inventory exists.

- Consider purchasing permanent desk-side recycling containers. Permanent recycling containers lend credibility to the program and will improve participation.

- New signage and supporting information explaining the solid waste and recycling system should be designed and distributed. Signage should be both clear and consistent.

- Communications and staff training for in-house waste management programs is recommended to ensure the on-going effectiveness of BCIT's recycling and waste minimization efforts.

- Simplify the beverage container collection system to increase participation and save costs. It is unnecessary to collect glass beverage containers separately from plastic and cans. Streamlining the system will eliminate one collection bin from each of the beverage container stations. This could also eliminate the need for the 20 cubic yard collection bin for glass containers.

- Target the compostables remaining in the waste stream. Consider implementing an expanded compostables collection program to include cafeteria food waste, paper towels and tissue paper.

- Given the volume of cardboard generated on the campus, it may be more economical to purchase or lease compaction equipment for cardboard and garbage at the two main cafeterias. A proposal for undertaking the cost-benefit analysis of compaction equipment will be submitted under separate cover.

- Update the Student Association website (www.sa.bcit.ca/environment/) to reflect current data and information.

2.4.2 Paper Recycling Review

The recycling operations review was initiated at the recycling area of the NE9 building. The consultant and the Environmental Education Coordinator (the audit team) met with Phil DeLuca, Facilities Management, Recycling Driver and worm composter extraordinnaire. The recycling driver position is one full time equivalent (FTE), which is supported by an additional half FTE – this staff person also does some garbage and litter collection.

The audit team rode on the recycling truck for several hours to observe the methods employed to collect the mixed paper, as well the condition of equipment and signage was noted. On this day, 12 full gaylords of paper were ready for pick-up. Approximately 10-12 full gaylords of mixed paper are sold to Best Recycling each week. See Appendix A for annual quantities recycled.

The first stage is the collection of paper. Mixed paper is collected throughout the campus in an assortment of containers. The collection containers include wheeled toters, white bags, and clear plastic bags for shredded paper. Full white bags of paper are collected by custodial staff and placed in

"green lockers" which are situated around the campus. The Facilities Management team collects and empties the white bags.

In large volume areas, toters are also used to collect paper. The toters are filled on-site by the system users and emptied by the recycling team using a switch-out system. When the recycling truck is full, or when the switch-out toters have been filled, the truck returns to the recycling area to empty the bins into the gaylords. At present there are only 6 switch-out toters. The lack of available toters for switch-outs usually forces the recycling crew to return to the recycling depot after each stop to empty them.

The paper is transferred by hand into the gaylords (see photo 1 in Appendix C). Paper is sorted into a single category, mixed waste paper where any contaminates are removed.

It was identified that no detailed records of quantities collected are maintained. This lack of data leads to uncertainty with respect to system requirements. Also, there is no equipment inventory that identifies the location of the white bags and racks, deskside equipment and existing toters. We recommend initiating a more detailed record keeping system and performing an equipment inventory. Detailed collection data will assist with the development of a better understanding of the system needs while an up-to-date inventory will assist with identification of capital cost requirements.

For example;

- In the SW1 building, 4th floor, the toter was overflowing with paper. This indicates a need for additional capacity or more frequent servicing.

- Main floor loading area of SW1, the toters were overflowing with paper and cardboard. The area was also contaminated with garbage (presumably from students). A cardboard recycling bin should be placed outside the doors and several toters (at least 3) should be added to the area. See photo 2 – Appendix C.

- At the SE6 building (The Barn) has "ideal set-up" of current system (2 toters, 1 glass bin, 1 plastic/cans bin). See photo 3 – Appendix C.

Miscellaneous materials are placed at recycling stations for pick-up. At the Barn we observed 14 boxes of old brochures waiting to be collected. Toters would eliminate the additional labour required to handle these types of materials – the system users could place the boxes directly into toters. Small amounts of cardboard are also placed near the central stations for collection. This cardboard is sold as mixed paper, thereby reducing its commodity value.

Communications

The work order system is used to communicate the needs of system users to the recycling crew. The work order system is a good communications tool and should allow the recycling crew to address problems in a timely manner. However, there are currently many orders already placed for white bag paper recycling but there are no spare racks for the white bags. This has resulted in requests for additional racks remaining unfilled – paper in these areas is most likely not being recycled.

2.4.3 Beverage Containers/Glass Recycling

BCIT has a unique and wonderful system of working with the "binner" community. There is an unwritten agreement with one binner, "Harry". Harry is allowed to sort through BCIT's dumpsters and outdoor garbage containers. Harry's contribution assists with the removal of beverage containers from the disposal stream. Additionally, this system is a realistic gesture toward the "binner" community who would do this work with or without permission. The consultant applauds this arrangement and recommends continuation of it. In addition to his binner duties, Harry sorts through the glass collection containers. Harry receives half the revenue for this service and the Student Association (SA) receives the other half.

The recycling team collects the plastic and aluminum beverage containers. The beverage containers are collected on a separate schedule from the paper. The separate collection schedule keeps the materials separate and the paper clean, as beverage container recycling can be very messy. Beverage containers are sold to the Collingwood Bottle Exchange. Revenue from the sale of these materials is paid to the Student Association.

BCIT maintains a 20 cubic yard bin for glass recycling. The glass bin is emptied about once per year at a total annual cost of $510. It is unnecessary to collect glass beverage containers separately from plastic and cans. Streamlining the system will eliminate one collection bin from each of the beverage container stations. This could also eliminate the need for the 20 cubic yard collection bin for glass containers. The remaining food jars could be collected in toters at generation points (cafeterias). Simplification of the beverage container collection system could increase participation and save costs.

2.4.4 Composting (Worm and Yard Waste)

In April 1997, BCIT launched one of Canada's largest worm-composting systems. There are approximately 170,000 worms consuming organic waste from two campus cafeterias. The worms process about 60 kg per day of coffee, fruit & vegetable cuttings. This system reduces campus waste by about 16 tonnes per fiscal year. The annual savings are approximately $377. See photo 4 in Appendix C.

Yard waste (leaves, grass clippings) from the campus is composted on site at the warehouse. Unfortunately no quantitative data was available for the yard waste composting system. Consequently, this data has not been included in this report.

2.4.5 Wood Recycling

Wood waste recycling was initiated in 1994 and has resulted in a significant reduction in waste sent to landfill. In 2001/02, over 82 metric tonnes of wood waste was collected and recycled. The wood waste recycling system appears to be functioning well.

2.4.6 Metal Recycling

The Construction Trades Department manages the metal recycling program. Consequently, the quantity of metal recycled has not been tracked in recent years. Metal recycling represents a significant volume of material diverted from landfill. Last fiscal year, over 293 metric tonnes of metal was recycled. The total revenue was $16,201. The metal recycling program appears to be performing well.

2.4.7 Office Areas

The office and administrative areas of the campus are well serviced with paper recycling and garbage containers. Signage and written communications about the solid waste program were not consistent. In some locations, posters were observed, while in other locations, there was no signage at all.

2.4.8 Classrooms

In classrooms, it was identified that although there were sufficient garbage containers, recycling containers were lacking. Many garbage containers had beverage containers, newspaper and notepaper inside. This indicates that additional recycling receptacles would improve student participation rates.

2.4.9 Cafeterias

The cafeterias were well serviced with beverage container bins. On top of most garbage containers there were blue boxes to collect beverage containers. Additionally, it was observed that stickers had been placed on most garbage container lids, indicating that beverage containers were not to be placed in the garbage.

2.4.10 Library

The library is well serviced with paper recycling bags. However, there are still too many garbage containers throughout the facility. The abundance of garbage containers facilitates the disposal, rather than the recycling of paper by students.

2.5 Contract Review

BCIT's garbage and recycling collection contract was reviewed to assess service levels and to identify areas for potential cost savings. The findings show that the contract with the solid waste collection company is detailed and well thought out but there is no requirement for annual reporting of service levels. Also, although the contract clearly outlines start times for waste collection, it was identified that the hauler consistently arrives at the campus as early as 5 am to begin collection.

Further it was identified that there is no contract with the paper recycler or with the beverage container collection company. Issuance of request for proposals for these services may benefit BCIT. The RFP process could improve service levels, such as the implementation of a toter program and/or compaction equipment for cardboard collection, BCIT may also benefit from improved and locked-in pricing for its mixed paper products.

BCIT should review its relational service agreements with all its service providers. This will ensure that appropriate remuneration is occurring and that data is being provided on a timely basis and in a format that allows for easy record-keeping. Current contracts or service agreements are important. They ensure annual review of costs and service levels that reflect BCIT's progress towards waste reduction.

3. Recommendations for 2002/2003

BCIT is performing at an acceptable level in terms of diverting waste to recycling at the Burnaby campus. Some programs should still be enhanced and expanded. Some of the following recommendations were taken from the previous sections and are considered to be the more important solid waste reduction initiatives to be pursued by BCIT. The recommendations below will move BCIT further along the path of waste reduction, reducing both disposal and recycling volumes making it a more sustainable institution.

Recommendations for the next fiscal year are:

1. Perform an inventory of recycling equipment.
2. Replace the current rack and bag collection system for mixed paper with the toter system.
3. Implement a “zero waste” program in office areas by replacing cardboard deskside recycling containers with permanent bins and mini-garbage containers.
4. Consider the purchase or lease of compaction equipment for cardboard and garbage at the two main cafeteria buildings.
5. Continue to monitor waste reduction performance and report the results throughout the BCIT network.
6. Perform solid waste and recycling audits of satellite campuses.
7. Develop new and consistent signage for:
   - ?? Individual recycling and garbage containers.
   - ?? Student and public recycling areas.
   - ?? Loading bay areas.
8. Develop new communications about recycling and waste reduction for faculty, staff and students. These should consist of new pamphlets and posters.
9. Develop a recycling/waste reduction education element for the training of new faculty and staff.
10. Work with buyers to improve packaging and delivery specifications with the goal of reducing the amount of incoming packaging waste to zero.

BCIT has experienced much success in establishing and executing waste reduction and recycling programs. Despite the success, there is still much to be done in order to attain a zero waste campus. Through the implementation of the aforementioned recommendations BCIT will continue to lead other institutions on the road to a more sustainable future.

Appendices

Appendix A

2001/02 Solid Waste and Recycling Data

Appendix B

Solid Waste Auditing Methodology and Safety Program

Introduction to Solid Waste Auditing

The principle of a solid waste audit is to take a sample of waste for a given facility over a specified time period. The garbage, recycling, and composting systems will be examined and the data quantified. Quantifying this information allows an organization to move forward in the direction of waste reduction and to know when it looks back how far it has come.

Purpose:

The purpose of the waste audit is to create a baseline of BCIT's waste and recycling rates, to improve effectiveness of existing programs and to design new programs where needed. Finally, this audit will be the catalyst for the development of a BCIT zero waste policy and action plan.

Background:

BCIT has always tried to reduce waste, recycle and compost to varying degrees of sophistication. All facilities recycle cardboard and office pack, some recycle plastic, and some have composting programs. While BCIT's efforts have made many gains, there is no systematic approach to communications and training, or measuring and monitoring of efforts with the goal of making strategic, well informed decisions and ensuring that the programs meet the stated objectives.

The baseline data provided by the waste audits will provide critical data for decision making and resource allocation. Ensuring up-to-date data will provide the tools necessary to further reduce our waste generation, to maximize re-use and recycling capacity and to cut overall operational costs. Conducting a waste audit is the first step in developing comprehensive and effective waste and energy policies and programs for BCIT.

Waste Audit Task List and Itinerary

One week before the audit

- ✍✍Call garbage and recycling service providers and request that garbage and recycling not be collected on the designated day. Request one or two years of collection data.
- ✍✍Identify one to two volunteers to help with the audit.
- ✍✍Locate a 20x20 space near the garbage and recycling area for audit work space.
- ✍✍Arrange for a digital platform scale (LCD readout on a post, 150kg capacity in 0.02kg increments - platform dimensions approx. 17" x 20").
- ✍✍Map the location of garbage and recycling containers.

Two days prior to audit

- ✍✍Check to see that equipment is ready to go (see equipment checklist and personal protective gear list.)
- ✍✍Label sorting bins according to the Solid Waste Definitions categories.

The day before the audit

- ✍✍Pick-up digital platform scale.
- ✍✍Check garbage and recycling containers for quantity of waste materials. If they are not full, the audit will need to be re-scheduled.
- ✍✍Check to see if any last minute items need doing.

Waste Audit Day

8 am – Set-up

- ✍✍Cover ground and sorting table with plastic sheeting in sorting area.
- ✍✍Place sorting table, sorting bins, and scale on plastic sheeting in sorting area.

8:30 am – The Audit

- ✍✍Discuss waste sorting methodology/strategy.
- ✍✍Review safety procedures.
- ✍✍Ensure everyone is wearing appropriate safety gear.
- ✍✍Sort, weigh materials and record data.
- ✍✍Clean-up area, put materials back into appropriate bins, make sure entire area is as clean.
- ✍✍Wash-up.
- ✍✍Debrief (e.g. discuss what was found and where it might have come from, ideas for reduction).

11 am – Recycling Audit

- ✍✍Open recycling bins, examine contents.
- ✍✍If time permits, weigh recycling materials and record data.
- ✍✍Wash-up
- ✍✍Debrief

Solid Waste Auditing Methodology

The following steps outline the methodology for sorting solid waste.

1. Ask everyone to introduce themselves and tell a bit about their role within the organization.
2. Distribute personal protective gear.
3. Explain safety considerations (see page 3).
4. Identify the location of the first aid kit and eye wash station.
5. Lay plastic sheeting on floor/ground to designate sorting area.
6. Label collection bins according to category and place in sorting area.
7. Set-up sorting tables and scale in sorting area.
8. The sorting process.
    a) Remove every 3rd bag from the dumpster to ensure a stratified sample.
    b) Continue removing and weighing bags until approx. 50 kg of waste has been collected.
    c) Carefully open the bags.
    d) Sort the waste into categories (see solid waste stream definitions).
    e) Weigh the materials by category.
    f) Record findings.
    g) Return all materials to appropriate locations.
    h) Cleanup. The entire sorting area should be clean and free from all waste debris.

Solid Waste Audit Safety

Safety Equipment

Appropriate personal protective equipment will be worn at all times by everyone engaged in the waste sort. This equipment includes the following items:

- Dust Masks
- Gloves
- Goggles
- Protective clothing

Safety Procedures

Safety is the responsibility of everyone involved in the waste sort. Proper procedures are essential to assure everyone's safety and minimize the chance or injuries or accidents.

Potential hazards while working on a waste sort include but are not limited to:

- Broken glass and sharps;
- Exposure to toxic chemicals;
- Fire or explosion caused by ignition;
- Site physical hazards including debris, uneven terrain, poor footing and water hazards;
- Heat stress from personal protective equipment.

To reduce these hazards and minimize their impact on safety, the following procedures will be followed during waste sorting activities.

- No eating/drinking/smoking while sorting.
- Use care in handling material to be sorted.
- Wipe up any spills, dirt and residue immediately.
- If any personal protective gear becomes damaged, immediately repair or replace it.
- No person should be in the waste sorting area alone.
- If anyone experiences physical discomfort, abnormalities, fatigue or light-headedness they should immediately stop work, inform the audit supervisor and leave the area.

When the sorting process is complete, ensure everyone carefully washes their equipment and hands.

Appendix C

Photo Gallery

Appendix C – Photo Gallery

Photo 1 – Gaylord is Filled by Hand

Photo 2 – Main Floor Loading Area SW1

Appendix C – Photo Gallery

Photo 3 – The "Ideal" Recycling Set-up at SE 6

Photo 4 – Worm Composting at the SE12 Building